

We claim:

1. A method for transmitting one or more training symbols in a multiple  
5 antenna communication system, said method comprising the step of:  
transmitting from a transmitter having N antennas at least one training  
symbol using at least one antenna, such that said at least one training symbol can be  
interpreted by a receiver having M antennas, where M is less than N.
- 10 2. The method of claim 1, wherein said receiver is a SISO receiver.
3. The method of claim 1, wherein said at least one training symbol is an  
802.11 a/g training symbol.
- 15 4. The method of claim 1, wherein said at least one training symbol  
comprises at least one long training symbol and at least one SIGNAL field.
5. The method of claim 1, wherein said at least one training symbol  
comprises a plurality of subcarriers and wherein each of said subcarriers are active on  
20 only one of said N antennas at a given time.
6. The method of claim 4, wherein said SIGNAL field indicates a  
duration that a receiver should defer until a subsequent transmission.
- 25 7. The method of claim 1, wherein said at least one training symbol  
comprises a plurality of subcarriers and wherein said transmitting step further  
comprises the step of diagonally loading said subcarriers across said N antennas.
8. The method of claim 6, whereby a lower order receiver can interpret  
30 said transmitted duration.

9. The method of claim 6, wherein said duration is represented as a duration of said transmission.
10. The method of claim 6, wherein said duration is represented as a length  
5 of said transmission.
11. The method of claim 4, wherein said SIGNAL field indicates a number of said antennas in said multiple antenna communication system.
- 10 12. The method of claim 11, wherein said number of said antennas allows said multiple antenna communication system to be scalable.
13. The method of claim 11, wherein said number of said antennas allows a receiver to correlate channel coefficients with corresponding transmit antennas.  
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14. A transmitter in a multiple antenna communication system, comprising:  
N transmit antennas for transmitting at least one training symbol using at least one antenna, such that said at least one training symbol can be interpreted by a  
20 receiver having M antennas, where M is less than N.
15. The transmitter of claim 14, wherein said receiver is a SISO receiver.
16. The transmitter of claim 14, wherein said at least one training symbol  
25 is an 802.11 a/g training symbol.
17. The transmitter of claim 14, wherein said at least one training symbol comprises at least one long training symbol and at least one SIGNAL field.
- 30 18. The transmitter of claim 14, wherein said at least one training symbol comprises a plurality of subcarriers and wherein each of said subcarriers are active on

only one of said N antennas at a given time.

19. The transmitter of claim 17, wherein said SIGNAL field indicates a duration that a receiver should defer until a subsequent transmission.

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20. The transmitter of claim 14, wherein said subcarriers are diagonally loaded across said N transmit antennas.

21. The transmitter of claim 17, wherein said SIGNAL field indicates a  
10 number of said antennas in said multiple antenna communication system.

22. A method for receiving data on at least one receive antenna transmitted by a transmitter having a plurality of transmit antennas in a multiple antenna communication system, said method comprising the step of:

15 receiving an indication of a duration to defer until a subsequent transmission, said indication transmitted such that said indication can be interpreted by a lower order receiver; and  
deferring for said indicated duration.

20 23. The method of claim 22, wherein said method is performed by a SISO receiver.

24. The method of claim 22, wherein said indication is transmitted in a SIGNAL field that complies with the 802.11 a/g standards.

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25. The method of claim 24, wherein said SIGNAL field is diagonally loaded across said plurality of antennas.

26. A receiver in a multiple antenna communication system having at least  
30 one transmitter having a plurality of transmit antennas, comprising:  
at least one receive antenna for receiving an indication of a duration to

defer until a subsequent transmission, said indication transmitted such that said indication can be interpreted by a lower order receiver; and  
means for deferring for said indicated duration.

5 27. The receiver of claim 26, wherein said method is performed by a SISO receiver.

28. The receiver of claim 26, wherein said indication is transmitted in a  
10 SIGNAL field that complies with the 802.11 a/g standards.

29. The receiver of claim 28, wherein said SIGNAL field is diagonally loaded across said plurality of antennas.

30. A method for communicating in a multiple antenna communication  
15 system, said method comprising the step of:

transmitting one or more symbols from a transmitter having N transmit branches;

obtaining feedback from at least one receiver indicating a performance for at least one of said N transmit branches; and

20 adapting one or more parameters of said at least one of said N transmit branches.

31. The method of claim 30, wherein said one or more parameters includes a number of active transmit branches.

25 32. The method of claim 30, wherein said one or more parameters includes a modulation scheme for said at least one of said N transmit branches.

33. The method of claim 30, wherein said one or more parameters includes  
30 an encoding rate for said at least one of said N transmit branches.

34. A transmitter in a multiple antenna communication system, comprising:

N transmit branches for transmitting one or more symbols;  
a feedback path for obtaining feedback from at least one receiver  
5 indicating a performance for at least one of said N transmit branches; and  
means for adapting one or more parameters of said at least one of said  
N transmit branches.

35. The transmitter of claim 34, wherein said one or more parameters  
10 includes a number of active transmit branches.

36. The transmitter of claim 34, wherein said one or more parameters  
includes a modulation scheme for said at least one of said N transmit branches.

15 37. The transmitter of claim 34, wherein said one or more parameters  
includes an encoding rate for said at least one of said N transmit branches.

38. A method for transmitting data in a multiple antenna communication  
system having N transmit antennas, said method comprising the step of:  
20 transmitting a legacy preamble having at least one long training  
symbol and at least one additional long training symbol on each of said N transmit  
antennas, such that said training symbols can be interpreted by a receiver having M  
antennas, where M is less than N.

25 39. The method of claim 38, wherein said legacy preamble further  
comprises at least one short training symbol.

40. The method of claim 38, wherein said legacy preamble further  
comprises at least one SIGNAL field.

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41. The method of claim 38, wherein said legacy preamble is an 802.11 a/g preamble.